BTEC Assignment Brief

Qualification	Pearson BTEC International Level 3 Diploma in Engineering Pearson BTEC International Level 3 Diploma in Mechanical Engineering Pearson BTEC International Level 3 Diploma in Manufacturing Engineering Pearson BTEC International Level 3 Diploma in Aeronautical Engineering Pearson BTEC International Level 3 Extended Diploma in Engineering Pearson BTEC International Level 3 Extended Diploma in Electrical/Electronic Engineering Pearson BTEC International Level 3 Extended Diploma in Mechanical Engineering Pearson BTEC International Level 3 Extended Diploma in Manufacturing Engineering
Unit number and title	**Unit 26: Mechanical Behaviour of Non-metallic Materials**
Learning aim(s)	**A:** Investigate how the structures of non-metallic materials influence their mechanical properties.
Assignment title	The effect of the structure on non-metallic materials on their mechanical properties and applications.
Assessor	
Issue date	
Hand in deadline	

Vocational Scenario or Context	You are working as an apprentice technician for a large company that manufactures mechanical, structural and bodywork components for the automotive industry. Your training supervisor has reviewed your progress and is impressed by your general understanding of the non-metallic materials used in the manufacture of the company's products. You have now been asked to investigate the structure of a range of polymer, ceramic and composite materials and evaluate their use in different applications.

Task 1	You are going to research the micro-structure of a range of non-metallic materials, evaluate how micro-structure affects their mechanical properties and evaluate the use of each material in a specific application. **To do this:** Your tutor will provide you with the names of six materials. These will consist of a pair of contrasting material from each group i.e two polymer, two ceramic and two composite materials. **You need to:** • Carry out research, using accredited data sources, on the micro-structure, composition and mechanical properties of each material. • Evaluate the relationship between material structure and mechanical properties including a detailed comparison of the properties of each pair of similar materials and their structure • Evaluate the use of each material in practice suggesting a suitable and specific application for each. **You then need to:** Produce a well organised technical report to present your findings. The report should be easy to read and include illustrations to support the text. It will be logically structured and use a high standard of written language including the use of appropriate engineering and technical terms. Your report should include: • Extensive information on the structures of each of the six materials (for example, the types of atomic bonding present in a ceramic material) • Annotated images or diagrams to support the text. • Details of at least three mechanical properties for each material taken from an accredited data source (for example, hardness, tensile strength, impact strength) • An evaluation of the effect that the material structure has on the mechanical properties of each of the materials investigated. • An evaluation of the use of each material in a suitable and specific application. You should make reference to material structure, mechanical properties and potential alternatives.

Checklist of evidence required	A written report containing information on six materials (two polymer, two ceramic and two composite), annotated images, referenced extracts from accredited materials data sources, evaluations of the effect of microstructure on mechanical properties and the suitability of each material I a specific application.
Criteria covered by this task:	
Unit/Criteria reference	To achieve the criteria you must show that you are able to:
26/A.D1	Evaluate, using vocational and high-quality written language, the relationship between the structures, mechanical properties and applications of at least two contrasting non-metallic materials from each group.
26/A.M1	Analyse the relationship between the structures and mechanical properties of at least two contrasting non-metallic materials from each group, suggesting a realistic application for each.
26/A.P1	Describe the structures of at least two contrasting materials from each non-metallic material group.
26/A.P2	Explain the relationship between the structures and mechanical properties of at least two contrasting non-metallic materials from each group, suggesting an application for each.
Sources of information to support you with this Assignment	Books Materials for Engineers and Technicians 6th Edition; Bolton W, Higgins R A; Routledge, 2014; ISBN 978-1138778757 Websites matweb.com makeitfrom.com
Other assessment materials attached to this Assignment Brief	A list of the six materials you have been assigned for use in this assignment. This will include two polymer, two ceramic and two composite materials.